



Ecological Impact Assessment

Maglin Greenway Phase 1

By: Dr Deborah McCormick, Flynn Furney Environmental Consultants

For: Cork City Council

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1. Introduction

This report comprises information regarding the ecological status of the proposed site of works, including an assessment of the potential impacts of the proposed works on the ecology of the surrounding area.

The project area is in Maglin, Ballincollig, Cork City, where it is proposed to deliver a significantly improved cycling and walking environment consistent with the Cork City Development Plan 2022 – 2028, Cork Metropolitan Area Transport Strategy (CMATS) and the Cork Cycle Network Plan (CCNP). This phase of the project is proposed to provide a high quality and direct route for pedestrians and cyclists between Maglin Road and Gaelscoil Uí Riordáin in Ballincollig, over approximately 1.4km, connecting to several residential developments along the way. The proposed works will include full construction of the route from ground improvement, drainage, formation, lighting, street furniture, landscaping, creation of access points, integration with adjacent developments and incorporation of local heritage.

At present, the route is primarily green field, with a 200m length which passes through green areas of an existing residential development (Carriganarra). The proposed corridor travels primarily along the line of the 1500mm city and harbour water supply pipeline from Inniscarra.

In addition to the present assessment, a screening exercise was also carried out as per the requirements of Article 6(3) of the Habitats Directive, in order to establish whether the plan or project is directly connected with or necessary to the management of sites designated under this Directive; or in view of best scientific knowledge, if the plan or project, individually or in combination with other plans or projects, is likely to have a significant effect on such a Designated Site. The above exercise concluded that no impacts were likely as a result of the proposed works on the conservation objectives or overall integrity of any Natura 2000 site due to the scale, nature of and distance from the works area, and the lack of any pathways for indirect impact on any European site.

This screening exercise aims to determine whether the proposed works have the potential to significantly impact upon the conservation objectives and overall integrity of any Natura 2000 sites. This assessment is based upon a desk study and field work carried out by suitably qualified ecologists. Also included is a general assessment of the ecological status of the site and the potential impacts of the proposed works on the ecology of the surrounding area, including Designated Sites.

The following definitions are used for the terms “impact” and “effect”:

Impact – Actions resulting in changes to an ecological feature, e.g. the construction activities of a development removing a hedgerow.

Effect – Outcome to an ecological feature from an impact, e.g. the effects on an animal population from loss of a hedgerow.

2. Methodology

2.1. Desk Study

A desktop study was carried out as part of this screening process to gain an understanding of the surrounding human and natural environments. This included a review of available data from a range of sources on the site and its immediate environs.

2.2. Data Used to Carry Out the Assessment

The following sources of data were employed:

- Environmental Protection Agency (EPA) Appropriate Assessment Tool;
- EPA Maps (to identify watercourses, hydrology and Natura 2000 site boundaries);
- NPWS protected species database and online mapping;
- The Geological Survey of Ireland hydrological and lidar data and map viewer;
- The National Biodiversity Data Centre archives;
- Inland Fisheries Ireland, and;
- An Bord Pleanála's online database

2.3. Field Survey

The field survey was carried out on 30th January 2023. Baseline ecological conditions were assessed. Habitats were classified according to A Guide to Habitats in Ireland (Fossitt, 2000). Where applicable, the habitat types and species usage were recorded (Smith et al. 2011; Scannell and Synnott, 1987; Wyse Jackson et al. 2016). Habitats were classified and dominant plant species noted according to the guidelines given by the JNCC (2010) with reference to best practice guidance for habitat survey and mapping (Smith et al., 2011) and Census Catalogue of the Flora of Ireland (Scannell & Synnott, 1987).

2.4. Criteria for the assessment of the value of ecological features

The impacts which may be expected from the proposed works at Maglin, Ballincollig, Co. Cork are assessed in Chapter 4 below. These possible impacts have been assessed under the CIEEM (2018) and the National Roads Authority guidelines (NRA, 2009). Criteria for assessment of duration of impacts used according to EPA guidelines (EPA, 2002). These provide guidance on assessing impact significance upon features of sites proposed for works. Impact significance must be given in context of the ecological value of the site and features under study.

The 'ecological value' of an area or feature thereof is defined with reference to geographical context. That is, whether it is of value locally, regionally, nationally, or internationally. This is assessed by ecologists on reviewing survey outcomes. Key criteria are the presence of designated sites, the site or feature

containing protected species or areas of high biodiversity. The criteria for ecological value are given in Table 1 below.

Table 1 Ecological Value Criteria

Ecological Value	Criteria
International	<ul style="list-style-type: none"> ▪ 'European Sites' including Special Areas of Conservation (SAC) & Special Protection Areas (SPA). ▪ Sites that satisfy the criteria for designation as a 'European Site' (see Annex III of the Habitats Directive, as amended). ▪ Features essential to maintaining the coherence of the Natura 2000 Network. ▪ Sites containing 'best examples' of the habitat types listed in Annex I of the Habitats Directive. ▪ Resident or regularly occurring populations (assessed to be important at the national level) of the following: <ul style="list-style-type: none"> ▪ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; and/or ▪ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive. ▪ Ramsar Sites ▪ World Heritage Sites (Convention for the Protection of World Cultural & Natural Heritage, 1972). ▪ Sites hosting significant species populations under the Bonn Convention ▪ Sites hosting significant populations under the Berne Convention
National	<ul style="list-style-type: none"> ▪ Areas of Special Scientific Interest (ASSI) or Natural Heritage Area (NHA). ▪ National Nature Reserves (NNR). ▪ Marine Nature Reserves (MNR). ▪ Area of Outstanding Natural Beauty (AONB). ▪ Refuge for species protected under the Wildlife (Northern Ireland) Order 1985 (as amended). ▪ Undesignated sites fulfilling the criteria for designation as an ASSI; NNR; MNR; and/or refuge for species protected under the Wildlife (Northern Ireland) Order 1985 (as amended). ▪ Resident or regularly occurring populations (important at the national level) of the following: <ul style="list-style-type: none"> ▪ Species protected under Wildlife (Northern Ireland) Order 1985 or Wildlife Act 1976, as amended); and/or ▪ Species listed on the relevant Red Data list. ▪ Sites containing 'viable areas' of the habitat types listed in Annex I of the Habitats Directive. ▪ Sites of Local Nature Conservation Importance (SLNCI). ▪ Areas subject to a Tree Preservation Order. ▪ Resident or regularly occurring populations (assessed to be important at the Regional level) of the following: <ul style="list-style-type: none"> ▪ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ▪ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ▪ Species protected under the Wildlife (Northern Ireland) Order 1985 (as amended); and/or ▪ Species listed on the relevant Red Data list. ▪ Sites containing areas of the habitat types listed in Annex I of the Habitats Directive that do not satisfy the criteria for valuation as of International or National importance. ▪ Regionally important populations of species or viable areas of semi-natural habitats or natural heritage features identified in the National or Local Biodiversity Action Plan (BAP), if this have been prepared. ▪ Sites containing semi-natural habitat types with high biodiversity in a regional context and a high degree of naturalness, or populations of species that are uncommon within the region. ▪ Sites containing habitats and species that are rare or are undergoing a decline in quality or extent at a national level.
Regional	

Ecological Value	Criteria
Local	<ul style="list-style-type: none"> ▪ Locally important populations of priority species or habitats or features of natural heritage importance identified in the Local BAP, if this has been prepared; ▪ Resident or regularly occurring populations (assessed to be important at the Local level) of the following: <ul style="list-style-type: none"> ▪ Species of bird, listed in Annex I and/or referred to in Article 4(2) of the Birds Directive; ▪ Species of animal and plants listed in Annex II and/or IV of the Habitats Directive; ▪ Species protected under the Wildlife (Northern Ireland) Order 1985 (as amended); and/or ▪ Species listed on the relevant Red Data list. ▪ Sites containing semi-natural habitat types with high biodiversity in a local context and a high degree of naturalness, or populations of species that are uncommon in the locality; ▪ Sites or features containing common or lower value habitats, including naturalised species that are nevertheless essential in maintaining links and ecological corridors between features of higher ecological value ▪ Sites containing small areas of semi-natural habitat that are of some local importance for wildlife; ▪ Sites or features containing non-native species that are of some importance in maintaining habitat links.

Ecological Impact Assessment must also consider the significance of effects that may be expected arising from a proposed development. CIEEM guidelines (2018) define a significant effect as:

“...an effect that either supports or undermines biodiversity conservation objectives for ‘important ecological features’...or for biodiversity in general. Conservation objectives may be specific (e.g., for a designated site) or broad (e.g., national/local nature conservation policy) or more wide-ranging (enhancement of biodiversity). Effects can be considered significant at a wide range of scales from international to local.

It also states that:

“...an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. A significant effect is a positive or negative ecological effect that should be given weight in judging whether to authorise a project: it can influence whether permission is given or refused and, if given, whether the effect is important enough to warrant conditions, restrictions or further requirements such as monitoring.”

The criteria for assessment of significance of effects is given in the following table (Table 2). It should be noted that significant effects may also include beneficial effects.

Table 2 Criteria for assessing significance of effects.

Impact Significance		Criteria
Significant Negative Effect	Major Adverse	<ul style="list-style-type: none"> ▪ Loss of, permanent damage to or adverse impact on any part of a site of international or national importance; ▪ Loss of a substantial part or key feature of a site of regional importance; ▪ Loss of favourable conservation status (FCS) of a legally protected species; ▪ Loss of or moderate damage to a population of nationally rare or scarce species.
	Moderate Adverse	<ul style="list-style-type: none"> ▪ Temporary disturbance to a site of international or national importance, but no permanent damage; ▪ Loss of or permanent damage to any part of a site of regional importance; ▪ Loss of a key feature of local importance; ▪ A substantial reduction in the numbers of legally protected species such that there is no loss of FCS but the population is significantly more vulnerable; ▪ Reduction in the amount of habitat available for a nationally rare or scarce species, or species that are notable at a regional or county level.
No Significant Effect	Minor Adverse	<ul style="list-style-type: none"> ▪ Temporary disturbance to a site of regional value, but no permanent damage; ▪ Loss of, or permanent damage to, a feature with some ecological value in a local context but that has no nature conservation designation; ▪ A minor impact on legally protected species but no significant habitat loss or reduction in FCS; ▪ A minor impact on populations of nationally rare or scarce species or species that are notable at a regional or county level.
	Negligible	<ul style="list-style-type: none"> ▪ No impacts on sites of international, national or county importance; ▪ Temporary disturbance or damage to a small part of a feature of local importance; ▪ Loss of or damage to land of negligible nature conservation value; ▪ No reduction in the population of legally protected, nationally rare, nationally scarce or notable (regional level) species on the site or its immediate vicinity. ▪ Beneficial and adverse impacts balance such that resulting impact has no overall affect upon feature.
	Minor Beneficial	<ul style="list-style-type: none"> ▪ A small but clear and measurable gain in general wildlife interest, e.g., small-scale new habitats of wildlife value created where none existed before or where the new habitats exceeds in area that habitats lost.
Significant Positive Effect	Moderate Beneficial	<ul style="list-style-type: none"> ▪ Larger new scale habitats (e.g., net gains over 1 ha in area) created leading to significant measurable gains in relation to the objectives of biodiversity action plans.
	Major Beneficial	<ul style="list-style-type: none"> ▪ Major gains in new habitats (net gains of at least 10 ha) of high significance for biodiversity being those habitats, or habitats supporting viable species populations, of national or international importance cited in Annexes I and II of the habitats Directive or Annex I of the Birds Directive.

The duration of impact must also be considered when assessing overall ecological impacts. The EPA have set out criteria for assessment of duration of impacts, with the following terms defined when quantifying duration (EPA, 2002).

- Temporary – up to 1 year
- Short-term – from 1-7 years
- Medium-term – 7-15 years
- Long-term – 15-60 years
- Permanent – over 60 years

Finally, the likelihood of impacts should also be defined. Assessment of likely impact followed CIEEM guidelines. These assess likelihood as follows:

- Almost Certain – probability estimated at greater than 95%
- Probably or Likely – probability estimated at between 50% and 95%
- Unlikely – probability estimated at between 5% and 50%
- Extremely Unlikely – probability estimated at less than 5%

4. Ecological Assessment Works

4.1. Site Location

The project is proposed to take place just south of Ballincollig, Cork and is proposed to link Maglin Road with the access road to Heathfield estate which would allow pedestrian/cycle access to the nearby Gaeilscoil Uí Riordáin. On the western end the proposed route runs through approx. 570lin.m of rough grassland between two residential areas; some 200m of the proposed route then passes through amenity areas of an existing development (Carrignarra) and passes to the south of Limeworth estate (200lin.m). A small pedestrian connection is provided to Limeworth estate. The eastern end (400lin.m) of the route runs south of a housing development under construction (Heathfield) across agricultural land. A small section of the proposed route runs adjacent to the Curragheen River (Figure 1.).

To the immediate north and south, the works area is bounded by suburban housing developments; further south beyond the Curragheen River the landscape is composed of a mosaic of improved agricultural grasslands.

The works area lies within the Lee, Cork Harbour and Youghal Bay 19 catchment, Glasheen (Cork City) _SC_010 subcatchment.

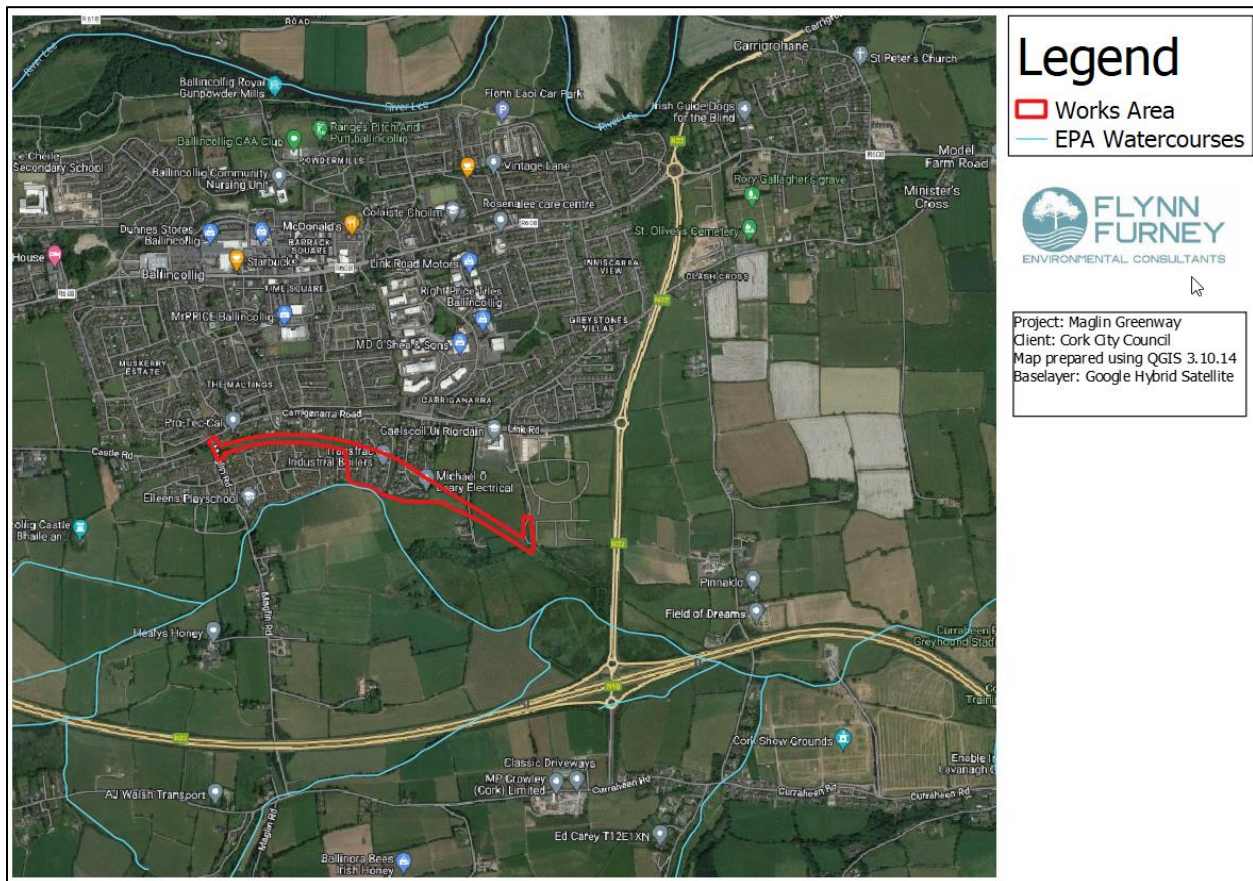


Figure 1 Overview of the works area

4.2. Receiving Environment

A description of the habitats of significant ecological value that were observed within the immediate surroundings of the works area are listed below, with descriptions adapted from “A Guide to Habitats in Ireland” by Julie A. Fossitt, 2000 (Figures 2, 3).

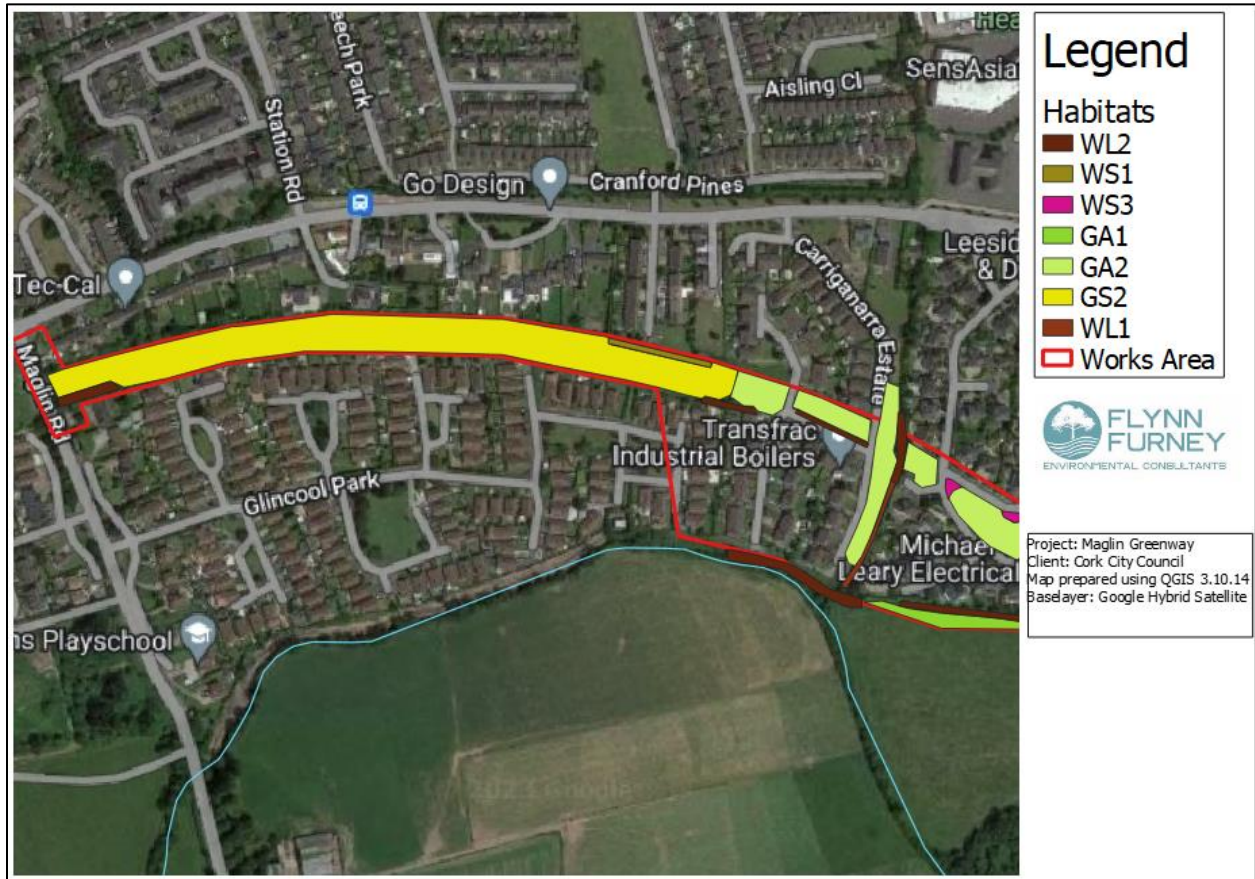


Figure 2 Habitat map of the western extent of the proposed works area

From Maglin Road, the works area is predominately dry meadow, **GS2** with some patches of scrub **WS1**, dominated by tussocky grasses such as cocksfoot *Dactylis glomerata* and *Holcus lanatus*. Immediately adjacent to the road, patches of winter heliotrope *Petasites pyrenaicus* were observed. There is a mature treeline of Leyland cypress *Cupressus x leylandii* along the boundary of a residence here **WL2**. Backing on to the access road to Ashton Court, a palisade fence with an area of scrub **WS1** is present, composed primarily of blackthorn *Prunus spinosa* and bramble *Rubus fruticosus* agg.

Within Carriganarra estate, the dominant habitat is amenity grassland **GA2**, with some ornamental tree planting. A treeline of willow *Salix* sp. and Leyland cypress **WL2** is present on the southern border, and a

row of cherry blossom *Prunus* sp. has been planted adjacent to the road **WL2**. To the east of this area as the route leaves the estate there is an earth bund with an immature treeline planted on it, consisting of oak *Quercus* sp., horse chestnut *Aesculus hippocastanum*, birch *Betula pendula*, beech *Fagus sylvatica*, holly *Ilex aquifolium* and blackthorn.

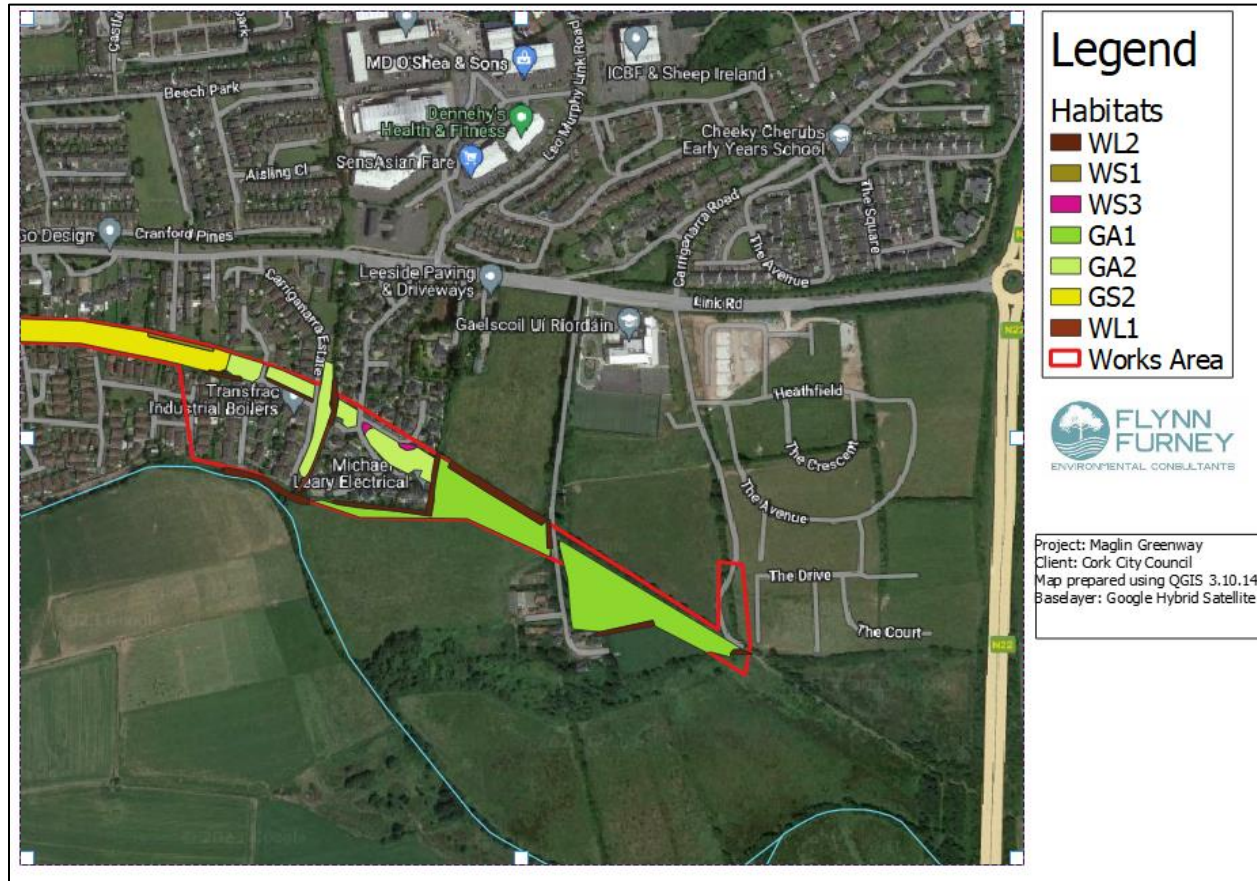


Figure 3 Habitat map of the eastern extent of the proposed works area

The proposed main route runs south and then east along the edge of Limeworth estate; it passes close to the River Curragheen where there is a riparian treeline of alder *Alnus glutinosa* and willow. A treeline **WL2** of hawthorn and laurel borders the southern extent of the residential areas; to the south is a large area of agricultural pastureland **GA1**.

To the east of Limeworth the route crosses improved agricultural grassland **GA1**, with an old stone wall and ash *Fraxinus excelsior* treeline adjoining the north edge. Also present is a scrub understory with bramble and blackthorn. The route crosses a farm track, where a hawthorn treeline is present, with two mature sycamore *Acer pseudoplatanus* and willow also present. The remainder of the route to the access road to Heathfield follows another small road adjoining more improved grassland **GA1**. The area to the

north of the route is being developed into a residential estate which has begun construction; a treeline that previously ran along the road has been removed by the developers.

4.2.1. Trees



Figure 4 Tree and Hedgerow records within the proposed works footprint. See accompanying report for further details.

All trees that have the potential to be removed due to construction works for the proposed route were recorded and their ecological value assessed in dedicated tree surveys carried out in January and April; a (see accompanying report, Furney & Nash 2023). The majority of the trees with the potential for impact are landscaped trees associated with the urban development in the area, many of which are non-native. Species recorded are noted above in the habitat descriptions where they occur and are summarised below (Figure 4 & Table 3).

Table 3 Tree species recorded during surveys.

Native	Non-native
Ash <i>Fraxinus excelsior</i>	Horse Chestnut <i>Aesculus hippocastanum</i>
Oak <i>Quercus robur</i>	Poplar <i>Populus sp.</i>
Holly <i>Ilex aquifolium</i>	Cherry Blossom <i>Prunus sp.</i>
Silver Birch <i>Betula pendula</i>	Beech <i>Fagus sylvatica</i>
Hawthorn <i>Crataegus monogyna</i>	Leylandii <i>Cupressus × leylandii</i>
Blackthorn <i>Prunus spinosa</i>	Sycamore <i>Acer Psuedoplatanus</i>
Willow <i>Salix spp.</i>	Alder <i>Alnus glutinosa</i>
Elder <i>Sambucus nigra</i>	

4.2.2. Surface water

No watercourses are present within the works area. The nearest watercourse to the proposed route is the Curragheen River, which runs adjacent to the works area where it runs south of the Limeworth housing estate, with a riparian treeline of alder and willow between the works area and the watercourse. The Curragheen is classified as At Risk under the latest WFD assessment cycle, with a water quality of Moderate. The watercourse is well buffered from the proposed route of works along most of its length bar the short section south of Limeworth; significant housing development lies between the route and the river along most of its length – towards the eastern end of the route the river lies across approximately 200m of pastureland.

4.2.3. Breeding Birds

All species of wild bird that occur naturally in Ireland are fully protected at all times by the Wildlife Act and relevant amending legislation. Similarly, all birds naturally occurring in the wild state are afforded a measure of protection by the EU Birds Directive, but derogations may reduce protection for specific reasons. As such, any vegetation clearance must be carried out outside of the bird nesting season (March 1st - August 31st).

No dedicated bird survey was carried out as part of this investigation. A number of trees and scrub areas were noted during the survey that would provide suitable nesting habitat for birds. The proposed works require removal of several trees and clearance of scrub and depending on the timing of the works a pre-construction nesting bird survey is strongly recommended prior to commencement.

4.2.4. Amphibians

No habitat suitable for either the common frog *Rana temporaria* or smooth newt *Lissotriton vulgaris* was noted during the survey.

4.2.5. Mammals

The habitat on the western extent of the proposed route, within the dry meadow/scrub habitat, might provide cover for mammals moving through the area; no particular sign of mammals was noted during the survey. None of the trees within the proposed route offer suitable habitat for roosting bats; a stone culvert on the edge of the Carriganarra estate does have some bat potential and may need to be further investigated prior to the commencement of works. Badger prints were noted adjacent to the farm road to the west of the proposed works; none of the habitat within the proposed works footprint was suitable for the species, however.

4.2.6. Invasive Species

The Wildlife Acts, 1976 and 2000, contain a number of provisions relating to invasive non-native species (INNS), covering several sections and subsections of the Acts. It is prohibited, without licence, to plant or otherwise cause to grow in a wild state, in any place in the State, any species of flora, or the flowers, roots, seeds or spores of invasive flora listed on the Third Schedule. Articles 49 and 50 of the aforementioned Acts set out the legal implications associated with alien invasive species and Schedule 3 (the Third Schedule) of the regulations lists non-native species subject to the restrictions of Articles 49 and 50, which make it an offence to plant, disperse, allow dispersal or cause the spread of invasive species.

No 3rd schedule species were noted during the survey. A number of non-native species were observed during the survey, mostly associated with adjacent gardens and amenity development. While not on the Schedule, many of these are quite invasive, and their removal/management should be considered during the works. These included winter heliotrope *Petasites pyrenaicus*, cherry laurel *Prunus laurocerasus* and old man's beard *Clematis vitalba*.

4.3. Nearby Designated Sites

All sites within 15km of the proposed works (and beyond) were initially considered as part of this screening. Only a single Natura 2000 site, *Cork Harbour SPA 004030*, lies within this radius, with a second, *Great Channel Island SAC 001058*, 5km beyond it in Cork Harbour. Although a short section of the proposed works area lies close to a connected receptor, the River Curragheen, the two European sites lie 15km and 20km downstream respectively from this point, in an estuarine habitat, no reasonable source-pathway-receptor connectivity is considered for a project of this nature and scale, and no reasonable pathway for impact exists (Figure 5).

Two pNHAs lie in the vicinity of the proposed works – *Ballincollig Caves 001249*, ca500m to the southwest, and *Lee Valley 000094*, ca1.8km to the northwest. Neither is hydrologically connected to the works area, and given the nature of, scale and distance to the works, no reasonable pathway for impact is considered to exist (Figure 6.)

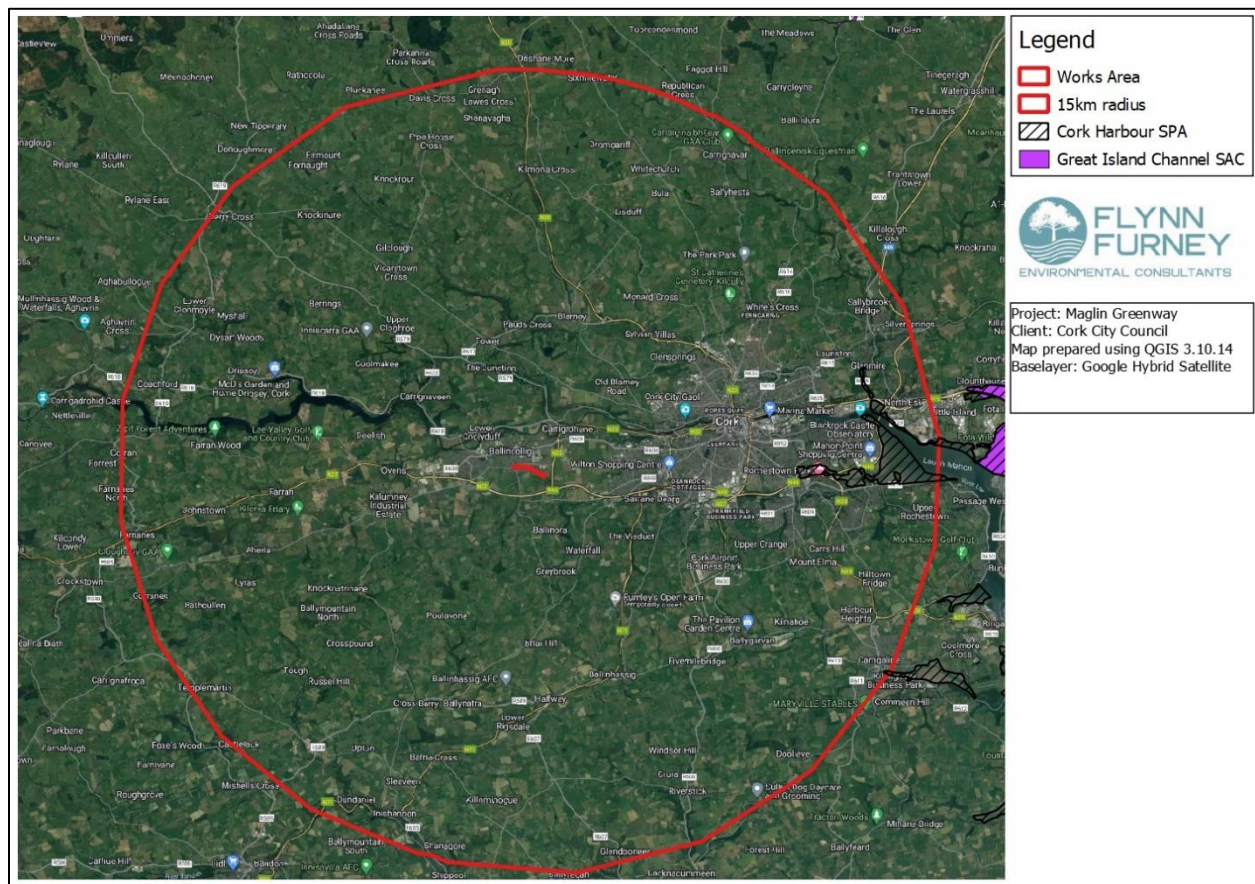


Figure 5 Natura 2000 sites in the vicinity of the proposed works



Figure 6 pNHAs in the vicinity of the proposed works

4.4. Proposed Works

The proposed works involve the creation of a walkway/cycleway along the proposed route, as well as upgrading existing infrastructure surrounding it and linking it to the adjacent residential areas. All ancillary services such as lighting/ducting and drainage, as well as fencing etc will all be created. A positive impact on biodiversity will also be implemented through the creation of a wildlife corridor and appropriate planting. See Figure 7 below for the proposed works route.

- Pavement design for greenway surfaces throughout.
- Connectivity of proposed greenway with existing adjacent residential estates to enhance permeability to abutting areas.
- Connectivity of proposed greenway with proposed adjacent residential developments
- Provision of uncontrolled pedestrian crossing facilities where necessary and where feasible. This will include the use of tabletop features to facilitate safe pedestrian, cyclist and vehicle interactions where required. This will also include the treatment of junctions where pedestrians meet live traffic.
- Repaving of existing footpaths where necessary.

- Installing new energy efficient public lighting and CCTV.
- Installation of street furniture and landscaping.
- Create an environmental 'living' corridor which will support pollinator populations, increase biodiversity, and optimise the benefits for flora and fauna along the route.
- Tree planting.
- Boundary treatments and fencing, including sensitive design of termination points to allow for future development of adjoining phases.
- SUDS based solutions for collection and discharge of surface water.
- Installation of ducting for services along the route as well as spare ducting for potential future usage.
- Highlighting of the former Cork to Macroom Railway through landscape design elements and by incorporating the remaining railway infrastructure into the scheme.



Figure 7 Proposed Route

5. ECOLOGICAL IMPACT ASSESSMENT

The site evaluation scheme of the guidelines outlined above in Chapter 2 would characterise the area within the immediate zone of influence of the propose works as being of *Local Importance*, given the disturbed and highly modified nature of the surrounding environment and the lack of priority species or habitats. There is a mosaic of habitats that are of some importance to wildlife in the vicinity however, and the semi-natural landscape is important in the context of the wider urban landscape of Ballincollig to the north and the intensively managed agricultural landscape to the south. The proposed route occupies in part an area of largely unmanaged land that offered a potential wildlife corridor through the modified landscape; the proposed works should be developed with the same potential in mind.

5.1. Ecological Features

5.1.1. Trees

As noted above, a dedicated tree survey was carried out as part of this study; given the highly modified nature of the landscape, the trees found along the works corridor are the primary feature with any ecological significance within the area of potential impact (see Table 4 and Figures 8-13 for results, summarised from report by Simon Furney and Jason Nash, Flynn-Furney Environmental Consultants).

Loss of hedgerows may be seen at sites 3, 4, 5 and 6. The impact here is reduced by the presence of two field entrances either side of the existing avenue. This avenue has well established boundaries along its length and is likely to be locally important to species such as commuting bats. Site 5 may be impacted on with the potential loss of the sycamore to accommodate a potential future connection to a proposed development to the north of the greenway.

The Blackthorn scrub and Ash treeline at sites 8 and 9 are a nice habitat feature in the area. Root damage should be avoided where possible to the mature trees. There was no evidence of 'Ash dieback' during the survey. The blackthorn is spreading into the field.

There are two mature willows at site 10 beside the poplar trees at sites 11 and 12. These are leaning into the field and may require removal.

Two boundaries that have been planted with trees are located at sites 11 and 12. The poplars at site 11 have been topped. The Poplars at site 12 are mature and are a feature at this end of the housing estate. The route will likely not have any impact on these trees. The trees are in good condition and do not appear to have any bat roost potential.

The boundary of the residences to the Southern end of Limeworth estate at sites 13, 14 and 15 are dense and may be trimmed back but should be retained where possible. Some of the boundary, along site 15, moving east has been cleared (45m) and is not as dense as you progress westwards. There are some

mature hawthorns along the boundary that can be retained. There is a further length (30m) of laurel along the boundary of the last residence to the west.

The tree at site 16 is a large ash that has some damage on its northern side. This tree may require removal on safety grounds. It may also have some bat potential.

Sites 17 and 19 will need to be removed. There are mature hedgerow species of elder, hawthorn, willow and blackthorn with a dense understorey of similar plants.

Site 18 is along the riparian zone on the watercourse. It is quite open as most of the dense hedgerow growth is on the southern side of the river.

Site 20 is the next riparian zone to the west of the proposed route. The alder and willow here may be retained to act as a buffer to the watercourse. Site 21 is developing scrub dominated by briars and may require some pruning.

Site 22 is hedging dominated by laurel. There is some pheasant berry growing in 3 locations. This is an invasive alien plant species.

Site 23 is an old field boundary that has been supplemented with native planting. The species are well mixed, and the route will only have an impact through the loss of some of these trees to provide pedestrian access to Limeworth.

The Cherry Blossom trees at site 24 have no associated planting. It is likely 7 will be retained and 4 will be removed.

The Leylandii at sites 25 and 27 are located along the boundaries of individual residences. The removal of these would have a positive ecological impact. Removal is subject to landowner permission. They are located quite close to the route at site 27 where they are causing a significant shading effect.

Table 4 Tree survey results

No.	Type	GPS	Maturity	Detail	Impact
1	Hedgerow	51.87921, -8.57602	Semi-mature	3 no. Willow Sp. and 1 no. Elder. Forms the end of a mature field boundary. Already impacted by adjacent works.	Likely to be retained.
2	Hedgerow	51.87949, -8.57791	Mature	Gappy mature Blackthorn hedge, adjacent to works.	Likely to be retained.

3	Hedgerow	51.88045, -8.57911	Immature	4 no. cut Ash on eastern side of old avenue south of field entrance. More mature Ash and Hawthorn in treeline outside site.	To be retained where possible.
4	Hedgerow	51.88055, -8.57913	Mature	Blackthorn hedge on the eastern side of old avenue, north of the field entrance	To be retained where possible.
5	Tree and Hedgerow	51.88056, -8.57926	Mature	Sycamore tree and Blackthorn hedge. Western side of old avenue with the tree on field side, north of field entrance..	Sycamore may be removed. Hedgerow to be retained where possible.
6	Hedgerow	51.88045, -8.57927	Mature	1 no. Willow 4 no. Blackthorn (3 no. immature Ash) western side of old avenue. South of existing entrance.	To be retained except to create pedestrian access to Limeworth.
7	Tree	51.88049, -8.57939	Immature	Single Ash In field to west of avenue.	May be removed.
8	Scrub	51.88097, -8.58031	Mature	Blackthorn Scrub spreading into grass field.	Some will be lost in field margin.
9	Treeline	51.88109, -8.58042	Mature	Ash Treeline Hawthorn/Blackthorn.150m. Evidence of coppicing. Stone ditch underneath with Bramble and Blackthorn.	To be retained.
10	Trees	51.88129, -8.58128	Mature	2 no. large mature willow	May be removed for safety reasons.
11	Tree line	51.88132, -8.58122	Semi mature	4 no. cut poplar.	Likely to be retained.

12	Treeline	51.88129, -8.58128	Mature	5 no. large Poplars with understorey of Viburnum.	Likely to be retained.
13	Hedgerow	51.88091, -8.58126	Mature	Hawthorn, elder, bramble, backed by laurel in garden	May require pruning.
14	Scrub	51.88077, -8.58159	Mature	Blackthorn Scrub and bramble over stonewall	May require pruning.
15	Hedgerow	51.88078, -8.5817	Mature	Blackthorn, hawthorn, elder. Some mature hawthorns can be found in areas that have been cut or planted with laurel.	May require pruning.
16	Tree	51.88087, -8.58358	Mature	Mature ash with some bat potential on boundary	May be retained.
17	Tree	51.88087, -8.58365	Semi mature	Elder out from boundary	To be removed.
18	Trees	51.88074, -8.58384	Immature	Hawthorn, Blackthorn sparse along riparian zone	To be retained.
19	Treeline	51.88088, -8.58377	Mature	2 no. Mature Hawthorn, 1 no. mature willow , 2 no. immature Hawthorn	To be removed.
20	Trees	51.88091, -8.58393	Semi mature	Riverbank with semi mature alder, willow.	To be retained where possible.

21	Scrub	51.88097, -8.58387	Immature	Developing scrub with bramble, Dock, nettle	May require pruning.
22	Hedge	51.88136, -8.58331	Mature	Garden boundary hedge, dense. Some laurel and pheasant berry.	To be retained.
23	Deciduous Tree line/Hedgerow	51.88184, -8.58304	Semi-mature	1 no. Oak 1 no. Horse Chestnut 1 no. Silver Birch 1 no. Holly 1 no. Blackthorn	To be retained except as necessary to provide pedestrian access to Limeworth.
24	Ornamental Planting	51.88201, -8.5836	Semi-mature	There were 11 no. Cherry Blossom In green area, adjacent to proposed quiet road.	It is likely 7 no Cherry Blossom will be retained and 4 will be removed.
25	Treeline	51.88222, -8.58485	Semi-mature	Leylandii and Willow. Forms a boundary of single residence.	Likely to be retained.
26	Scrub	51.88259, -8.58588	Mature	Blackthorn Scrub, 80m in length. Along fence line of housing.	Likely to be retained.
27	Treeline	51.88223, -8.59196	Mature	45m of mature Leylandii trees along boundary of single residence.	May be removed with permission of landowner.

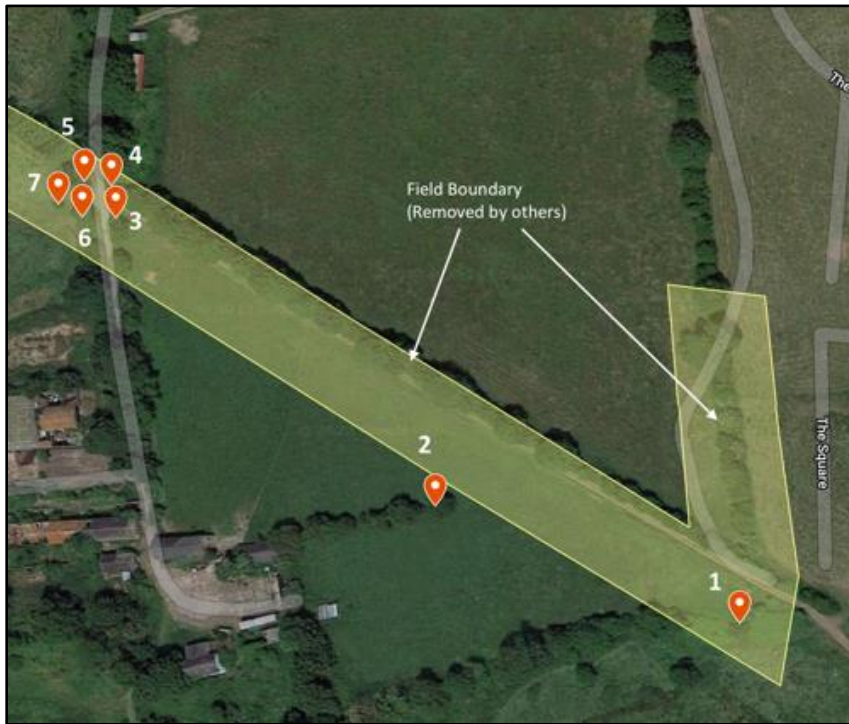


Figure 8 Tree locations eastern section



Figure 9 Tree locations for fields east of Limeworth



Figure 10 Tree locations for fields south of Limeworth and Carriganarra Estate. Riparian section.



Figure 11 Tree locations in Carriganarra Estate



Figure 12 Tree locations in Glincool



Figure 13 Tree locations at Maglin Road

The exact impact of the proposed route on the trees listed above may be ascertained when the route is marked out. Native trees will be retained where possible. The route of associated fencing will determine which trees or hedging will be retained or not. The loss of or damage to trees and hedgerows within the works area would constitute a *probable minor adverse effect* on this feature, given the importance of some of the identified trees to local biodiversity. There is a great deal of scope within the proposed project

to mitigate this effect, through linear planting along the greenway fence line and boundaries with native species, which will also facilitate the creation of a wildlife corridor benefitting songbirds and bats.

Root protection of trees to be retained should be considered. Damage to more than ¼ of a tree's root zone should be avoided. Any large tree roots exposed by works should be left with a clean cut, with exposed roots covered with hessian prior to backfilling.

There is some laurel in the open landscaped areas. The removal of this plant would be a positive action as it is an invasive and its spread will be avoided. The removal of these invasives as well as some of the aforementioned *Cupressus x leylandii* constitutes a *probable minor beneficial effect* on this feature, given the invasive nature and shade creation of those species.

5.1.2. Bats

None of the trees within the proposed route offer particularly suitable habitat for roosting bats; an old railway bridge on the edge of the Carriganarra estate does have some bat potential and may need to be further investigated prior to the commencement of works. The existing treelines and hedgerows do offer the potential as corridors for the movement of bats across the landscape; care should be taken to maintain connectivity through this area when designing compensatory planting should these treelines be disturbed as part of the proposed works. The operational phase will introduce light along the corridor which has the potential to impact foraging bat populations; some species have been shown to benefit from the aggregation of prey insects around the light, whereas some have been shown to be negatively affected. Given the proximity of the area to existing streetlighting in the adjoining estates, it is considered *highly unlikely* that the addition of the light from the greenway constitutes an additional impact. This would constitute a *negligible, long-term effect* on the bat populations of the area, given the already modified nature of the landscape and the proximity of available wildlife corridors to existing light sources.

5.1.3. Birds

Some scrub and hedgerow features were noted during surveys as providing potential habitat for nesting birds. Additionally, the potential of noise during construction and operations of the proposed works to disturb nesting birds exists, although, again, given the highly modified nature of the landscape and the proximity of residential housing, this *probable impact* is considered to be *negligible* and *short-term*. A pre-construction nesting bird survey is highly recommended prior to the commencement of any works, depending on timing. New planting of native species along the boundary of the greenway should enhance the potential of the area for nesting birds over time and will constitute a *minor long-term beneficial effect* on this feature.

5.1.4. River Curragheen

The Curragheen River passes within 20m of the works area south of the Carriganarra housing estate, with a riparian treeline of willow and alder separating the two. Along most of the length of the proposed route

more than 100m separates the two, with a residential development and a riparian corridor intervening. No direct hydrological connection exists between the works area and the watercourse, although the close proximity of the works area to the river at this point does pose some potential of surface water contamination. The Curragheen is classified as At Risk under the latest WFD assessment cycle, with a water quality of Moderate.

The watercourse is well buffered from the proposed route of works; significant housing development lies between the route and the river along most of its length – towards the eastern end of the route the river lies across approximately 200m of pastureland. At the point where the route passes close to the river, a vegetated buffer of willow and alder exists, and care should be taken to retain as much existing vegetation between the works footprint and the receiving watercourse as possible. Given the nature of the intervening landscape and the nature of and scale of the works, and the intervening distance from most of the works area and the watercourse, *negligible, short-term impacts* from suspended solids/mobilised nutrients from contaminated surface water runoff entering the river channel from the proposed works area are considered to be *unlikely*.

5.2. Conclusions

The landscape in the vicinity of the proposed works footprint is highly modified, lacking priority species or habitats, but nonetheless providing some important habitat *locally* for biodiversity. The only ecological features of significance within the works area are hedgerows and trees, and they should be retained wherever possible, depending on the final route chosen. No significant impacts are predicted from the proposed works, and the project presents several opportunities for compensating that *minor* impact which is predicted, as well as net biodiversity gain, in the form of planting native hedgerows, removal of invasive species, and habitat management for pollinators along the route corridor.

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